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Assisting University Reactors in Regulatory Challenges

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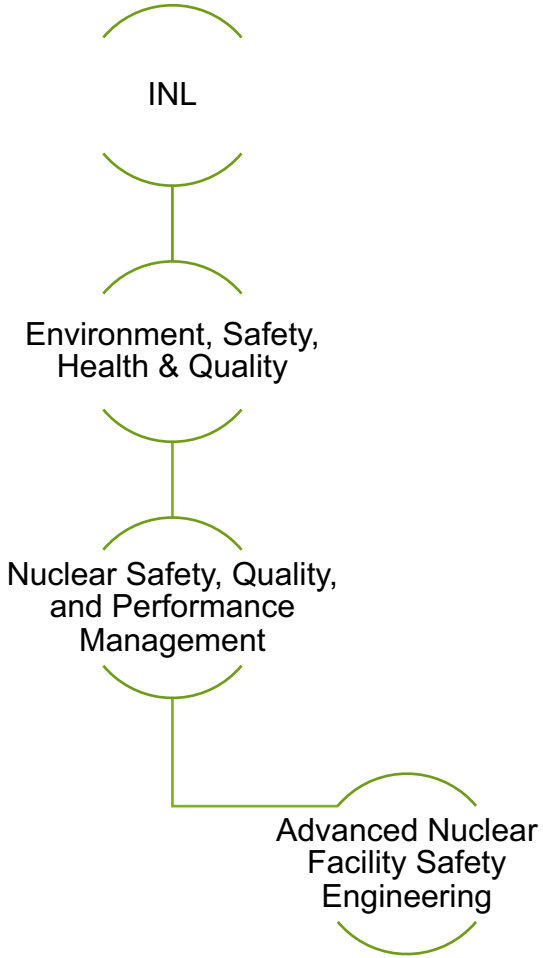

- Responsible for development of safety basis for new nuclear reactors at INL.
- Dedicated team of qualified nuclear safety analysts with diversified backgrounds.
- Current projects include:
  - VTR
  - MARVEL
  - NRIC testbeds
  - NRIC reactor demonstrations
  - TICAP
  - Other federal agency reactor activities.

Potential Opportunities

- Staffing challenges identified in NSUF reactor fitness study:
  - *"Maintaining and organizing important drawings and documents, such as SAR basis documents.*
  - *Increasing knowledge sharing between national laboratories and universities, e.g., funding the use of outside expertise, in particular when performing analysis for the SAR.*
  - *Maintaining adequate staffing for major license actions such as LARs and SAR revisions*."
- Proposed solutions:
  - *"Providing DOE-created generic safety analysis for common reactor types to be documented in peer-reviewed publications.*
  - *Establishing a small budget at DOE to support university reactors, through technical outreach and the use of expertise at national labs.*
  - *Establishing a DOE proposal program to request technical support… would be used to provide technical expertise that may not exist at small facilities."*

Proposed Solution

- Creating DOE proposal to provide university reactors assistance to:
  - Develop generic safety analysis by reactor type and collection of supporting analysis.
  - Update individual university SARS.
  - Assist in licensing amendments.

- Collaborative effort with universities:
  - DOE provide technical experts and staff as needed.
  - Partially fund university staff for licensing work as cost share.
  - Fund internship for students.
- Apply industry best practices to safety basis, adding risk-informed performance-based approaches as applicable.

Development of Generic Safety Analysis

- Three phases of development:
  1. AGN
  2. TRIGA
  3. Others
- Generic components to be developed:
  - Historical records and analysis such as fuel qualification.
  - Development of generic reactor models (neutronics and thermohydraulic).
  - Failure modes and effects analysis.
  - Probabilistic risk assessment.
  - Updated generic list of safety SSCs to new ANSI/ANS 15.22 standard.
  - Updated dose consequence models.
  - Updated transient/accident analyses.

Updating Individual SARs

- Develop System Design Descriptions (SDDs) that contain the detailed descriptions of non-safety systems, instead of SAR.
- Update drawings and documentation.
- Update SAR components:
  - Natural Phenomena Hazards (NPH) and demographics.
  - Classify safety SSCs to meet new ANSI/ANS 15.22 standard.
  - Update safety SSC information.
  - Summarize non-safety SSCs and reference SDDs for information.
  - Update core information and calculations, as necessary.
  - Update transient/accident analysis.

License Amendments

- Due to small staffing sizes with limited experience, 63% of responding facilities to NSUF survey need assistance with license amendments.
- Establish a competitive grant process for licensing assistance for:
  - Digital consoles upgrades.
  - New experiments such as fueled.
  - Necessary TS changes or modifications.
- DOE could potentially assist as needed to:
  - Complete calculations and updated models.
  - Update dose consequence calculations, failure modes, and safety analysis.
  - Develop application with required SAR updates.
  - Respond to request for information to reduce timeline.

Questions or suggestions?

- Please email matthew.lund@inl.gov with additional questions or suggestions on how we can help.